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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/537,723	03/30/2000	Takashi Iwasa	P107348-09095	9078

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EXAMINER	
HARPER, HOLLY R	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/537,723	IWASA ET AL.	
	Examiner	Art Unit	
	Holly R. Harper	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 12/9/03

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 20 March 2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Kim (USPN 5,908,699).

In regard to claim 1, the Kim reference discloses an electronic element with a cesium-carbon-oxide layer (Abstract). The layer forms tips in an FED (Figure 3, Element 36). The layer is formed by deposition (Column 3, Lines 63-66).

3. Claims 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Sullivan et al. (USPN 5,821,680).

In regard to claim 16, the Sullivan reference discloses an electronic element that has at least two layers of amorphous carbon film (Abstract). This includes a main body and a surface layer. The surface layer has an amorphous-tetrahedrally coordinated carbon material (Column 8, Lines 1-4).

In regard to claim 17, the Sullivan reference discloses that the electronic element is used as a field emitter for cold cathode field emission applications (abstract). Field emitters emit

electrons with the application of an electric field to the cold cathode element (Column 4, Lines 2-4).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (USPN 5,908,699).

In regard to claim 2, the Kim reference discloses that the film has an amorphous film of carbon (Abstract) and that the projections are conical (Figure 3, Element 36). The Kim reference does not disclose the height of the tips. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Increasing the height increases the relative field strength at the tips and would be manipulated to meet the desired limitations. Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to specify the height of the emitter tips to be between 10 and 500 nanometers, since discovering an optimum value of a result variable is considered within the skills of the art.

In regard to claim 3, the Examiner notes that the claim limitation of the amorphous film of carbon formed by an ion beam deposition process using a negative ion beam is drawn to a process of manufacturing, which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over prior art by a process limitations.

Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

In regard to claims 4 and 5, the Kim reference discloses that the amorphous film of carbon is a cold cathode element (Abstract), which emits electrons when an electric field is applied (Column 1, Lines 30-40).

6. Claims 6-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pehrsson et al. (USPN 6,554,673).

In regard to claim 6, the Pehrsson reference discloses an electronic element with a main body formed of amorphous film of carbon (Claim 1) that contains cesium (Column 3, Lines 47-52). Cesium is a metal element having a metal bond radius equal to or larger than two times the atom radius of carbon. A layer of amorphous film of carbon is used as a surface layer over the main layer (Column 3, Line 65 – Column 4, Line 3). The Pehrsson reference does not specifically state that the amorphous carbon is tethrahedrally bonded. Amorphous carbon can be either sp^2 or sp^3, but tetrahedrally bonded carbon is harder, more transparent, and more electrically insulating than sp^2. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to have an amorphous carbon that is tetrahedrally bonded because of its beneficial properties for displays.

In regard to claim 7, the Pehrsson reference discloses an amorphous carbon film layer. It is a property of the surface layer that the half-value width Hw of a photoelectron spectrum of C_{1S} is equal to or smaller than 2.0 eV.

In regard to claims 8 and 9, the Pehrsson reference discloses that that the main body has a plurality of projections (Figure 1f, Elements 11a) containing cesium (Column 3, Lines 49-51). The surface layer of amorphous carbon is formed under the thin protective layer (Figure 1f, Element 18) (Column 3, Line 65 – Column 4, Line 3). Therefore, the surface layer would be formed over the projections (Element 11a) and part of the film projecting downward.

In regard to claims 10 and 11, the Pehrsson reference discloses that the amorphous carbon layer contains cesium (Column 3, Lines 47-52).

In regard to claims 12 and 13, the Examiner notes that the claim limitation of " said main body and said surface layer formed by an ion beam deposition process " is drawn to a process of manufacturing, which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

In regard to claims 14 and 15, the Pehrsson reference discloses that the electronic element emits electrons with the application of an electric field to the cathode (Abstract).

7. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pehrsson (USPN 6,554,673) in view of Cuomo et al. (USPN 5,852,303).

In regard to claims 18 and 19, the Pehrsson reference discloses an electronic element that has a main layer of amorphous carbon with cesium and a surface layer of amorphous carbon. The Pehrsson reference does not specify the amount of cesium in the amorphous carbon film, but the Cuomo reference teaches that the percentage of cesium should be between .01 and 25 percent of the carbon content (Column 10, Lines 18-22). If the amount of cesium is above 25%, the

concentration is so high that the cesium atoms will bond with each other, creating a less stable matrix (Column 4, Lines 15-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a concentration of cesium in a range of .01 to 25 percent, as taught by Cuomo, to prevent the cesium atoms from bonding with each other and making the matrix less stable.

Response to Arguments

8. Applicant's arguments with respect to claims 1-15 and 18-19 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's arguments filed 12/9/03 with respect to claims 16 and 17 have been fully considered but they are not persuasive.

In regard to applicants claim that Sullivan is missing claimed limitations, the Examiner respectfully disagrees. The claim does not contain the limitation "a metal element having a metal body radius equal to or larger than two times the atom radius of carbon" (Page 7, Lines 8-10 of the response). Sullivan does meet all the claimed limitations of the claim.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Harper whose telephone number is (571) 272-2453. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Holly Harper
Patent Examiner
Art Unit 2879

Joseph Williams